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CLAIMS

1. A suspended particle device (4, 27, 29, 31, 35, 39) comprising:

at least one compartment for housing a particle suspension (10, 10a, 10b, 10c);

means for applying a first electric field to the particle suspension (10, 10a, 10b, 10c), configured so that the first electric field has a first orientation; and

means for applying a second electric field to the particle suspension (10, 10a, 10b, 10c), configured so that the second electric field has a second orientation that is different from said first orientation.

2. A suspended particle device (4, 27, 29, 31, 35, 39) according to claim 1, wherein said first and second orientations are mutually perpendicular.

3. A suspended particle device (4, 27, 29, 31, 35, 39) according to claim 1 or 2, comprising a plurality of spacers (9, 30, 32, 36) for defining a pluraiity of compartments.

4. A suspended particle device (29) according to claim 3, wherein said means for applying a second electric field to the particle suspension are provided by said spacers (30).

5. A suspended particle device (35) according to claim 3, wherein said means for applying a second electric field to the particle suspension are provided within said spacers (36).

6. A suspended particle device (4, 27, 31) according to claim 3, wherein said means for applying a second electric field to the particle suspension (10, 10a, 10b, 10c) are located on said spacers (9, 30).

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7. A suspended particle device (27) according to claim 6, wherein said means for applying a second electric field are arranged to apply an inhomogeneous electric field to the particle suspension (10, 10a, 10b, 10c)

8. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of the preceding claims and comprising a plurality of compartments, configured so that one or more electric fields may be applied to a selected particle suspension (10a, 10b, 10c) independently of at least one other particle suspension (10a, 10b, 10c).

9. A suspended particle device (27, 39) according to claim 7 or 8, further comprising an active matrix (41).

10. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of the preceding claims, configured to apply first and second electric fields simultaneously to one or more particle suspensions (10, 10a, 10b, 10c).

11. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of the preceding claims, configured so that transmittance and reflectance properties of one or more particle suspensions (10, 10a, 10b, 10c) can be tuned to a grey value.

12. A suspended particle device (4, 27, 29, 31, 35, 39) according to claim 10, configured to apply first and second electric fields in turn to one or more particle suspensions (10, 10a, 10b, 10c) according to a driving scheme.

13. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of the preceding claims, wherein at least one of said first and second electric fields is an AC field.

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14. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of the preceding claims, wherein at least one of said first and second electric fields is a DC field.

15. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of the preceding claims, wherein at least one of said first and second electric fields is a homogeneous electric field.

16. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of the preceding claims, wherein at least one of said first and second electric fields is an inhomogeneous electric field.

17. A suspended particle device (4, 27, 29, 31, 35, 39) comprising:
a transparent plate (5);
a substrate (6); and
a piuraiity of spacers (9, 30, 32, 36);
wherein said spacers (9, 30, 32, 36) define a plurality of pixels.

18. A suspended particle device (4, 27, 29, 31, 35, 39) according to claim 17, wherein one or more of said pixels are compartments defined by the transparent plate (5), substrate (6) and spacers (9), said compartments being arranged to house a particle suspension (10a, 10b, 10c).

19. A suspended particle device (4, 27, 29, 31, 35, 39) according to claim 17 or 18, wherein said plurality of spacers (9, 30, 32, 36) comprise means for applying an electric field to a compartment.

20. A suspended particle device (4, 27, 29, 31, 35, 39) according to claim 19, wherein one or more of said pixels are defined by regions within a compartment arranged to house a particle suspension (10a, 10b, 10c) and said spacers (9) comprise means for simultaneously applying a first electric

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field with a given field direction to a first region and a second electric field with the same field direction to at least one other region.

21. A suspended particle device (33) according to claim 19 or 20, wherein the means for applying an electric field are located within the spacers (36).

22. A suspended particle device (27) according to claim 19 or 20, wherein the means for applying an electric field are provided by the spacers (30).

23. A suspended particle device (4, 27, 31) according to claim 19 or 20, wherein the means for applying an electric field are located on the spacers (9, 32).

24. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of claims 17 to 23, wherein one or more electric fields may be applied to a selected pixel (10a, 10b, 10c) independently of at least one other pixel (10a, 10b, 10c).

25. A suspended particle device (27, 39) according to claim 20 or 24, further comprising an active matrix (41) for addressing the pixels.

26. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of claims 17 to 25, configured to apply first and second electric fields simultaneously to one or more pixels (10a, 10b, 10c).

27. A suspended particle device (4, 27, 29, 31, 35, 39) according to any one of claims 17 to 26, configured so transmittance and reflectance properties of a pixel (10a, 10b, 10c) can be tuned to a grey value.

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28. A suspended particle device (4, 27, 29, 31, 35, 39) according to claim 27, configured to apply first and second electric fields to one or more pixels (10, 10a, 10b, 10c) according to a driving scheme.

29. A transflector comprising a suspended particle device (4, 27, 29, 31, 35, 39) according to any one of claims 1 to 28.

30. A transflective display (19) comprising:
a display device (20); and
a transflector according to claim 29.

31. A method of operating a suspended particle device (4, 27, 29, 31, 35, 39) including a particle suspension (10, 10a, 10b, 10c), comprising the steps of:
applying to the particle suspension (10, 10a, 10b, 10c) a first electric field with a first field direction to control alignment of particles therein; and
resetting the suspended particle device (7, 27, 29, 33, 37) by applying to the particle suspension (10, 10a, 10b, 10c) a second electric field with a second field direction that is different from the first field direction.

32. A method according to claim 31, wherein the suspended particle device (4, 27, 29, 31, 35, 39) comprises a plurality of pixels in the form of separate particle suspensions and at least one of said first and second electric fields are applied only to one or more selected particle suspensions.

33. A method according to claim 31 or 32, wherein the suspended particle device (4, 27, 29, 31, 35, 39) comprises a plurality of pixels in the form of regions of a particle suspension (10, 10a, 10b, 10c).

34. A method of displaying an image comprising:

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tuning the transmittance and reflectance properties of at least one of a plurality of pixels in a suspended particle device (7, 27, 29, 33, 37), wherein said at least one pixel is tuned independently of at least one other pixel.

35. A method according to claim 34, wherein one or more of said plurality of pixels are discrete particle suspensions (10a, 10b, 10c).

36. A method according to claim 34 or 35, wherein one or more of said plurality of pixels are regions within a compartment housing a particle suspension (10, 10a, 10b, 10c).

37. A method according to claim 35 or 36, wherein said step of tuning comprises:

applying one or more electric fields to one or more pixels.

38. A method according to claim 37, wherein a plurality of electric fields are applied simultaneously to the pixel.

39. A method according to claim 37, wherein a plurality of electric fields are applied to the pixel in turn, according to a driving scheme.

40. A method according to any one of claims 34 to 39, further comprising:

resetting the suspended particle device (4, 27, 29, 31, 35, 39) by tuning at least one pixel, so that the transmittance and reflectance properties of the pixels are constant across the suspended particle device (4, 27, 29, 31, 35, 39).